# Kim Anderson - Re: NTIA Correspondence

**From:** Kim Anderson
**To:** Janice Shields
**Date:** 1/27/2003 1:30 PM
**Subject:** Re: NTIA Ccrrespondence
**CC:** Betty Poulsen; James Ball; Kathryn O'Brien

Janice,

Per my voicemail message, if you would please forward the original correspondence #030807939 from Mr. Wentland (dated 11/12/02) to Betty Poulsen in the Policy division. Per our dlscussion during thls mornings staff meeting, Jim Ball ls to prepare the response letter (instead of SAND). Please give me a call if you have any questions.

Thanks, Janice!

UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and
Information Administration
Washington, D.C. 20230

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Mr. Donald Abelson
Chief, International Bureau
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Dear *Mr.* Abelson:

The National Telecommunications and Information Administration (NTIA) appreciates this opportunity to review and comment on the Federal Communications Commission's (Commission) Notice of Proposed Rulemaking (NPRM) in the *Matter of Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz, the L-Band. and 1.6/2.4 GHz Band.*[1] NTIA is only addressing the interference issues and associated recommendations. We are not taking a position on any other policy issues associated with the NPRM.

In the NPRM, the Commission requests comment on proposals received from New ICO Global Communications (Holding) Ltd. (ICO), Motient Services Inc., and Mobile Satellite Ventures subsidiary (MSV) to operate ancillary terrestrial component (ATC) base station transmitters (BTS) with their networks using assigned mobile satellite service (MSS) frequencies. The BTS would operate in the 1525-1559 MHz band (MSV Proposal), or the 1990-2025 and 2165-2200 MHz bands (ICO Proposal). The BTS is *to* be integrated with the satellite network and will employ directional antennas that *are* expected to provide coverage *to* areas where the satellite signal is attenuated by foliage or terrain or to provide in-building coverage. In addition to the BTS, MSV will employ pico base stations that may be located on ceilings of buildings or on building walls and will use omni-directional antennas. There are also mobile terminals (MTs) that will be used in conjunction with the BTS and pico base stations.

In the NPRM, the Commission recognized that the unwanted emissions from terrestrial stations in the MSS will have to be carefully controlled in order to avoid interfering with GPS receivers.[2] The Commission specifically requested comments on whether limits for base stations similar to those specified in Section 25.213(b) for satellite mobile earth stations (MES) used in

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[1] *In the Matter of Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz, the L-Band, and 1.6/2.4 GHz* Band, IB Docket No. 01-185 (rel. Aug 17,2001).

[2] *Id. at* ¶68.

conjunction with the satellite are adequate to protect GPS receivers.[3] The frequency range over which the emission limits specified in Section 25.213(b) apply is 1574.397-1576.443 MHz. There are two issues that must be considered in the Commission's request for comment on the protection of GPS: 1) the frequency range over which the emission level would be applicable; and 2) whether the emission level established for a MES should be applied to a base station. Furthermore, the NPRM did not address the emission limits of the MTs used in conjunction with the BTS and pico base stations.

The frequency band 1545-1555 MHz is allocated to the aeronautical mobile satellite route service (AMS(R)S) in the space-to-Earth direction. AMS(R)S is reserved for communications relating to safety of flight (see provisions No. 1.36, 1.59, S.357A, and Article 44 of the Radio Regulations). The frequency band 1530-1544 MHz is allocated to the Global Maritime Distress and Safety System (GMDSS) in the space-to-Earth direction. This international application is required by international treaty resulting from the Safety of Life at Sea (SOLAS) Convention. Since the BTS will have emissions that fall within the AMS(R)S and GMDSS receiver channels there is a potential for interference. However, the NPRM did not request comment on potential interference to AMS(R)S and GMDSS receivers.

To address the potential interference to GPS, AMS(R)S, and GMDSS receivers, NTIA performed three technical analyses that are provided as enclosures to this letter. Based on the results of the analysis in Enclosure 1, NTIA cannot support the Commission's proposed BTS emission levels in the GPS L1 (1559-1610 MHz), L2 (1215-1240 MHz), and L5 (1164-1188 MHz) frequency bands. Instead, NTIA recommends: 1) a maximum allowable equivalent isotropically radiated power (EIRP) of -71 dBm/MHz (wideband emissions) and -81 dBm (narrowband emissions) in the L1 frequency band; and 2) a maximum allowable EIRP of -73 dBm/MHz (wideband emissions) and -83 dBm (narrowband emissions) in the L2 and L5 frequency bands.

The Commission did not propose an emission level for the MTs used in conjunction with the BTS and pico base stations. Based on the results of the analysis in Enclosure 2, NTIA recommends: 1) a maximum allowable EIRP of -75 dBm/MHz (wideband emissions) and -85 dBm (narrowband emissions) in the L1 frequency band; and 2) a maximum allowable EIRP of -77 dBm/MHz (wideband emissions) and -87 dBm (narrowband emissions) in the L2 and L5 frequency bands.

Also, the Commission did not make a proposal for BTS-adjacent channel emissions in the channels used by AMS(R)S and GMDSS receivers. Based on the results of the analysis in Enclosure 3, NTIA recommends: 1) a maximum allowable EIRP of -32.8 dBm/200 kHz per BTS carrier in the 1545-1555 portion (AMS(R)S channels) of the 1525-1559 MHz band; and 2) a maximum allowable EIRP of -22.5 dBm/200 kHz per BTS carrier in the 1530-1544 MHz portion (GMDSS channels) of the 1525-1559 MHz band.

[3] *Id*

The United States Coast Guard and the Navy expressed concern regarding aggregate interference from MTs used in conjunction with BTS to Inmarsat satellite receivers that are used to support GMDSS operations (1626.5-1645.5 MHz) and AMS(R)S operations (1646.5-1656.5 MHz). While these federal agencies do not operate the satellite transmitter, the operation of these satellite receivers is required under treaty obligations. The interference to a satellite receiver from a large number of MTs is cumulative, and will affect the up links from all mobile terminals located in the satellite beam, such as those used for GMDSS and AMS(R)S. Based on the analysis in Enclosure 4, operation of MTs at the EIRP level proposed by MSV co-channel with GMDSS and AMS(R)S operations should be avoided. The analysis in Enclosure 4 also shows that operation of MTs at the EIRP levels proposed by MSV on channels adjacent to GMDSS and AMS(R)S operations is feasible.

The National Oceanic and Atmospheric Administration (NOAA) operates Search and Rescue Satellite (SARSAT) Local User Terminals (LUTs) in the 154.4–1545 MHz portion of the 1525-1559 MHz band. SARSAT provides distress alert and location information to appropriate public safety rescue authorities for maritime, aviation, and land users in distress. The LUTs are used to receive the information from the SARSAT satellites. NOAA currently has 14 LUTs at 7 known locations, therefore coordination with BTS operators is possible. Based on the analysis in Enclosure 5, a 30 km distance separation between a BTS and a SARSAT LUT is necessary for compatible operation. Possible techniques to reduce the distance separation include but are not limited to: 1) reduce the BTS antenna gain in the direction of the SARSAT LUT location; 2) lower the BTS emission level in the 1544-1545 MHz portion of the 1525-1559 MHz band; and 3) take into account specific terrain features and other obstacles located between the BTS and SARSAT LUT location on a site-by-site basis.

The NTIA proposed emission levels in the GPS bands for the BTS and pico base stations are believed to be achievable with current technology. Since these stations can implement larger filters that will provide additional attenuation of the out-of-band emissions. The NTIA proposed reduction of the adjacent channel emissions to protect AMS(R)S and GMDSS receivers are also believed to be achievable. NTIA recognizes that the emission levels in the GPS bands for the MTs used in conjunction with the BTS and pico base stations may be difficult to achieve using current handset technology. However, the trends in handset development indicate a reduction in adjacent band and out-of-band emissions may be possible.

The calculations of maximum allowable EIRP of the BTS and pico base stations are based on a variety of assumptions, not all of which may apply in every installation. Since there are no limitations on the antenna heights for the base stations used in the system architecture proposed by MSV, the analysis results of the pico base station, which represents the limiting interference case, are used to establish the maximum allowable EIRP levels necessary for compatible operation with GPS receivers. Because installations of BTS and pico base Stations must be licensed, it may be possible to include installation restrictions in the license. For example, to restrict the maximum density of BTS installations there should be a minimum separation distance between BTSs of 1 km. The license should include limitations on the

minimum antenna height of the BTS and pico base stations that will assure sufficient separation from GPS receivers. Provisions should also be included in the license to restrict base station operations within 500 feet of a runway.

NTIA has obtained the views of both industry and the Federal agencies. To this end, NTIA had a number of discussions with MSV. MSV provided NTIA their analysis which was based on a 8 slot Time Division Multiple Access (TDMA) access technique that is consistent with the Global System for Mobile (GSM) communications system architecture. Their analysis also included a specific vo-coder frame occupancy rate that reduces the effective average power of the MT by the duty cycle attributed to the frame occupancy, For example, using an 8 slot TDMA system architecture, employing a quarter rate vo-coder, would reduce *the* effective average power (averaged o v a a 20 millisecond period) of an MT by 15 dB (10 Log 32). If these or similar techniques are employed, *the* EIRP levels specified for the MTs can be achieved.

In *summary,* NTIA has only focused on the interference issues and resolution thereof and not *taken* a position on any other policy issues. NTIA would appreciate an opportunity to consider our technical analysis with *the* Commission's staff and stands ready *to* support the implementation of this developing technology while ensuring the protection of GPS and other safety related systems.

Sincerely,

Fredrick R. Wentland
Acting Associate Administrator
Office of Spectrum Management

5 Enclosures